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ABSTRACT

A pilot study explored how to teach students to write thoughtfully, and also how to teach computers to recognize and interpret the kinds of thinking that appear in such writings. First, a taxonomy of mental processes was found, next the linguistic expressions (clues) that indicate the processes were hypothesized, and then a professionally-written corpus was selected and analyzed to see where the indications or clues would appear. Results showed that clues are related to mode rather than to a writer's peculiarities, and that writers can vary their writing styles. Results also showed that on a broad level, the hypothesized clues distinguish basic kinds of development of thought, separating those with an essential temporal orientation from those without it; and on a more specific level, that related analytic mental processes usually work together. (Five tables of data and one figure are included; 27 references are attached.) (RAE)

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CLUES TO MODE OF DISCOURSE

Revision of a Paper Presented to

15th International Systemic Conference

East Lansing, Michigan, U.S.A., August 8-12, 1988

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Two ultimate goals motivate the pilot study that I am reporting here. One is to teach students to write thoughtfully; the other is to teach computers to recognize and interpret the kinds of thinking that appear in such writings. To tell students or computers what to do, we need to be able to specify how various kinds of thinking are expressed. I assume that different mental processes underlie different ways of developing ideas. Also, I like to assume that writing expresses thinking, so that, in part, often the terms are synonymous. (Witte and Cherry support my assumption, 120). We need a system of linguistic expressions that indicates precisely the the method by which an idea is developed. My method consists of first finding a taxonomy of mental processes, next hypothesizing the linguistic expressions that indicate the processes, and then selecting and analyzing a professionally-written corpus to see where the indications or clues appear. My results show that on a broad level, the hypothesized clues distinguish basic kinds of development of

thought, separating those with an essential temporal orientation from those without it, and on a more specific level, that related analytic mental processes usually work together.

Mental Processes

Cognitive psychologists such as Patricia Carpenter and Marcel Just recognize that readers use the traditionally-taught rhetorical devices to "structure the information in the text and to guide it smoothly" into their minds. "A reader is ... packing in information quickly. But he doesn't know what the high-level structure is ahead of time; his task is to discover and construct it" (Waldrop). When readers and listeners use the text, the context, and their previous knowledge to construct propositions to remember, they do not recall which specific grammatical or lexical forms were used and which were not, especially in concrete material (Lachman et al.). This project investigates how linguistic features encode the mental processes that are expressed in the content.

The mental processes that I chose to explore are the ones expressed in description, classification, definition, comparison and contrast, exemplification, narration, and analysis of cause and effect. They can be called rhetorical modes, strategies, patterns of development, organizing structures, or sub-genres. In the language of composition teachers, mode means this type of

sub-genre, not the media that parallel field and tenor, as systemic linguists use the term. A practical reason for the choice of this list was the easy availability of labeled sets of models of them; many composition textbooks present them, although some texts substitute models explaining a procedure or process for doing something -- anything -- for one or more of the other modes. Some English teachers are beginning to raise philosophical doubts about composition instruction that should be teaching the process of writing yet is based on these models of excerpted selections, devoid of context (Welch).

An important theoretical reason for choosing this list of modes is the relationship of these modes to logical processes that are performed by human beings and expressed by computers. I have arranged them on "Table One: Modes by Three Taxonomies." Description applies to specific items and events, which can be defined and classified. Logical definition consists of identifying an item within a general classification or a larger category and then distinguishing it from other members of its class. The distinctions of course involve comparison and contrast, looking at similarities and differences. Extended definitions with synonyms also involve comparison and contrast. Someone who wishes to explain a classification in a more specific manner may use examples or may partition the class into its parts and enumerate them in temporal, spatial, or logical order.

All these processes are called static logical patterns by Frank D'Angelo in his interpretation of Aristotle, as shown on

Table One: Modes by Three Taxonomies

Static	DESCRIPTION	definition, classification, division, exemplification	EXPOSITORY
Progressive	NARRATION	syllogism, cause & effect, process	Proceedural, Narrative
	ARGUMENTATION	comparison-contrast	Behavioral
D'Angelo	BAIN (in capitals)		Longacre

the top left part of Table One. Thinkers or writers use these static patterns for induction and for deductive or syllogistic reasoning. D'Angelo contrasts them with the progressive logical patterns of syllogism, process, cause and effect, and narration. Writers with certain purposes use temporal order to explain the steps in a process or to give instructions on performing the process. A writer may explain a cause and effect relationship between events or may simply record a narrative of the events with their temporal order.

I do not suggest that the this taxonomy reflects similar mental processes for students, writers, cognitive psychologists, and computer programs. Description and narration differ from the other modes, which are called analytic. Analytic thought manipulates descriptive information. Description requires the basic mental processes of attention, perception, and abstraction of qualities which are based on the recognition of patterns that were learned and placed in memory at some prior time. In description, organization by time order is only incidental, while narration reports events that have an essential chronological relationship. Narration develops from episodic memory (or imagination) of events, while analytic modes are based on semantic memory of general knowledge.

Analytic modes can be handled by computer programs already operable in applications of artificial intelligence (Firebaugh). To do so, explicit information must first be encoded in forms that the program recognizes. The correct propositions fuel inference engines that use predicate calculus and propositional calculus to make inferences related to description and the analytic modes. Computers need an additional script or frame of situational and prototypical knowledge in order to evaluate non-explicit sequences or to appreciate the plot of a narrative. Although machine parsers can already encode or represent brief bits of knowledge, most natural expression is so complex or ambiguous that human interpretation is necessary, at least until further assistance becomes available, such as aid based on a system of linguistic

clues. Representation of knowledge is still a problem. The challenge is to use linguistic clues as a guide to representing natural language in propositons or other forms that computer programs can manipulate with their limited capabilities of doing arithmetic, of storing, retrieving, comparing, and replacing symbols, and of repeating these processes.

This Aristotelian taxonomy of modes of writing has no status beyond common use. In fact, the editor of Research in the Teaching of English, Arthur Applebee, declared in February, 1988, "There is no widely accepted taxonomy of types of writing, and certainly none that holds up to empirical examination of the kinds of tasks on which students can be expected to perform similarly well.... The categories we usually work with -- whether drawn from Aristotle, Bain, Britton, Kinneavy, or more mundane sources -- provide at best a first rough cut into a very complex universe."

A taxonomy that is not yet known well by many authorities in English education is the one expounded by Robert Longacre in The Grammar of Discourse; before narrow articulation, it broadly distinguishes behavioral and expository discourse from narrative and procedural discourse on the basis of the essential temporal sequences within the latter pair. (These divisions are marked on the right of the table.) Longacre notes that Indo-European languages, especially English, have great versatility in their means of indicating expository notions (such as expressing contrast via predication, nominalization, or conjunction, pp. 78-79). Although he includes description with exposition, he

suggests that it might be different (10, 266). His division of procedural discourse concurs with the theories of comprehension that distinguish procedural knowledge from declarative knowledge (i.e. facts, data).

The taxonomy that is best known is probably Alexander Bain's, with its categories of narration, description, exposition, and argumentation. (These categories appear in capitals in the four corners of Table One.) Since Bain combines cause and effect with D'Angelo's static logical patterns in the category of exposition, his system does not focus on distinguishing the products of the mental processes that I want to examine. Bain's system is the basis of a body of research on children's writing. Results indicate that, for young writers, narration and description seem to be easier and less complex than exposition and argumentation (Frogner; Seegers; Bortz; Johnson; O'Donnell, Griffin, and Norris; Anderson and Bashaw; Veal and Tillman; Nietzke; and Pope; also, see note). In these studies, descriptions tend to be relatively short and simple except for modification of nouns; the only complexity in narrative is coordination; meanwhile, exposition carries the load of complexity until students are mature enough for good argumentation. According to an earlier study of published writings, mode influences the proportion of syntactic forms, specifically the ratio of adjectives to verbs (Boder). These studies have different variables, but they all point in the same direction in their search for complex development.

Clues

Mature writing states illocutionary and perlocutionary purposes explicitly (Dasenbrock). How? A list of specific linguistic clues might indicate the type of development a writer is using. I attempted (in The Thirteenth LACUS FORUM 1986) to create an explicit list of linguistic clues for each pattern of thought or development, building on suggestions made by Lee Odell. He included lexical items, syntactic features, and some of the cohesive devices classified by M. A. K. Halliday and Ruqaia Hasan in Cohesion in English. "Table Two: Development by Cohesion, Structure, and Content," names the patterns across the top as headings for each column. Below them are listed the types of potentially cohesive items that indicate that pattern. Next are the other types of structures, and, at the bottom, are some related content words or vocabulary.

The relevant cohesive devices are not the ones like pronouns that are essential for holding attention on a topic while it is being developed; the indicative devices, such as comparatives and conjuncts, precisely match the rhetorical patterns which express that type of development, at least locally. They are optional, as all the other clues are, because the specific rhetorical development can be marked by other explicit linguistic devices, or the development may be merely implicit in the arrangement of information in a rhetorical pattern, without any specific linguistic indication in the surface structure. The complexities of cohesive thought and expression created problems in the areas that are associated with cohesion in

Table Two: Development by Cohesion, Structure, and Content

	DESCRIPTION	DEFINITION	PARTITION	CLASSIFICATION	EXAMPLE
TERMS COHESIVE BETWEEN SENTENCES			Ordinal numbers, Additive conjuncts	General classes	Specifics with general classes
OTHER TYPES OF STRUC-TURES	Attributive adjectives or details that entail or imply them	General classes with specified limits		Predicate nominatives	
EXAMPLES OF POSSIBLE CONTENT WORDS	above abroad abut adhere align altitude apart approach area arm around asunder away back background	characteristic connote convey denote determine distinctive distinguish essence exclusive express imply inclusive indicate intend label	allocate allot alphabetize alternate another apiece apportion arrangement assign attribute between catalog certain chain codify	admit aggregate analysis array assemblage assortment branch bunch bundle catalog category class clump cluster collection	archetype case demonstrate designate especially example exemplify expressly illustrate instance model namely particular precedent prototype

Table Two: Development by Cohesion, Structure, and Content (Continued)

	COMPARISON-CONTRAST	NARRATION	PROCESS	CAUSE-EFFECT	SYLLOGISM
TERMS COHESIVE BETWEEN SENTENCES	Comparatives, Adversative conjuncts	Temporal conjuncts	Temporal conjuncts	Causal conjuncts	
OTHER TYPES OF STRUC-TURES	Superlatives, Negatives, Verbal after meanings of begin or stop, Simile, Metaphor	Time order with same grammatical subject	Imperative, Time order		General Classes with specifics and all or no
EXAMPLES OF POSSIBLE CONTENT WORDS	aberration	aboriginal	actual	account	all
	accord	afternoon	advent	accrue	always
	affinity	afterward	anticipate	affect	climax
	agree	age	approach	arise	complete
	alien	ago	change	attribute	comprehensive
	allegory	ancestor	coexistent	because	conclusion
	allied	ancient	coincident	beget	consider
	alliteration	antecedent	coming	breed	consummate
	allusion	antedate	contemporary	bring about	corollary
	alternatively	antiquate	current	calculate	criticize
	analogy	antique	descendants	cause	culmination
	antagonism	archaic	doomsday	conduce	customary
	antipodes	autumn	earlier	consequence	decide
	antithesis	back	eventual	consequently	decree
	antonym	before	expect	contingent	deduction

student essays examined by Ruie Jane Pritchard. Her findings imply that cohesive ties can be important indications of mental processes. Although cohesion as defined by Halliday and Hasan requires that a relationship extend across a sentence boundary, the potentially cohesive terms have their effect of showing rhetorical development within a sentence as well as between sentences. To say clues they are "Cohesive between Sentences" only identifies the source of these clues.

Both the cohesive type of clues and the clues that are labeled "Other Types of Structures" can be counted in a literal, mechanical way, without regard to content. An example is the predicate nominative that Odell proposed as indicative of some sort of classification, which is also reflected in the predicate that is called "is a" in some propositional programs.

The remainder of the clues are content words. Suggestions appear in the starter vocabulary list in Table Two. If complete, it would be long but finite. Its terms may appear in meta-discourse when writers tell how they are developing the topic, but the words have other uses too. For a term to be counted, it must pass the test question, "Does this term indicate that the writer is performing the specified mental process or is developing the content in the specified pattern?" The list cannot be interpreted mechanically because of the multiple meanings that do not indicate a mental process or a method of development. The list does not consider the location of the linguistic clues within a sentence, although their

position in topic or comment may be very important. In description, sentence themes are various significant parts or aspects of the hypertheme, Červenka demonstrates, yet in narrative the themes are monotonously the cast of characters.

Material Examined

The names of the seven chosen rhetorical modes serve as labels for short selections in a chapter on the topic of personality, in Writing and Reading Across the Curriculum by Laurence Behrens and Leonard J. Rosen, a text that has now gone into a second edition. The restriction of topic avoids variations based on topic; the short length allows selections to be analyzed completely. Some extremely short duplicates were used to plan the data collection sheets, one was cut at fifty sentences because it ran to 198, and another long piece was omitted because it had several ellipses but accompanied an alternate labeled with the same mode. The remainder comprise the corpus of this study. The section of the chapter devoted to definition has two articles, both very short, one of which ("What Is Personality?") was written by the authors who also wrote the single narrative selection ("The Three Faces of Eve"). These double offerings permit comparing authors' styles in two modes and examining variations within a rhetorical pattern.

In addition, two unlabeled selections on other topics were chosen as supplements for their contrast with the academic textbook selections on a single topic. One is a letter that begins, "Darlings," and is published in a linguistics book as an

example of the characteristics of personal letters between close friends (Gregory and Carroll, Language and Situation, 29). Another supplement was chosen as a speech to a mass audience: "I Have a Dream," by Martin Luther King, Jr., which is widely anthologized. In order to maintain comparable length, only the first fifty sentences of King's speech were examined. The material totals about 10,000 words.

Results

Analysis of the selections began with numbering the sentences as punctuated. I read each selection successively for each type of clue in each mode. Records included the key word in the clue and the sentence number where the clue appeared. Then the frequency of occurrence was tabulated for each mode in each selection. When a predominance of 397 negatives in the contrast mode seemed to threaten to obscure other categories, all negatives were eliminated from the count. Results are reported in "Table Three: Rhetorical Clues in All Selections."

The selections analyzed are named briefly at the top of the table, along with the number of sentences in that selection and its label for mode. The rhetorical modes are listed down the left side. The body of the table reports the number of clues for each mode in each selection. Thus, the column headed "Corporate 54 Class" indicates that the selection entitled "Corporate Personalities" has 54 sentences. It is labeled as exemplifying classification and indeed has 64 clues to classification (which are primarily general classes). This selection has fewer clues for the other modes: 49 for

Table Three: Rhetorical Clues in All Selections

	Personlity 25 Defin	Type A 29 Defin	Self-Act 27 Descr	Corporate 54 Class	Nixon 61 Exemp	3 Faces 58 Narra	Body Type 46 Cause	Neurotic 43 Contr	Darlings 14	Dream 58
Defin	16*	11*	7	11	7	4	9	18+	0	6
Descr	10	13	12*	31	31	26#	14	33+	7#	39
Class	19#	35#	24	64*#+	39	23	39#	37	4	27
Exemp	3	7	2	6	7*	8	38+	9	1	13
Narra	4	1	2	5	17	26*#+	2	12	4	10
Cause	8	11	10	6	11	7	23*+	18	0	5
Contr	12	34	26#	49	63#+	24	30	56*#	5	48#
Negs (not in Contr)	5	15	10	9	17	23	16	27+	1	30

* The count for the mode as the editors labeled it.

\# The count for the mode that occurs most often in the selection.

\+ The highest number of clues for each mode.

Table Four: Rhetorical Clues in "Bradley Headstone"

	Descr	Defin	Class	Examp	Contr	Narra	Cause	Total
Number of Clues	21*#	6	8	3	10	0	6	54
% of Total	38	11	15	6	19	0	11	100

comparison-contrast, 11 for definition, 31 for description, 6 for exemplification, and so on.

Chi square statistics compared each selection (including the unlabeled selections and a combination of the two short definition selections) with the mean frequency of the clues (negatives excluded) in the labeled selections. Results show that the narrative selection is significantly different from the mean (X^2 = 15.96, p = .01, 6 df), and the cause-effect selection also differs significantly from the mean (X^2 = 24.05, p = .001, 6 df). Furthermore, the narrative selection differs very significantly from the cause-effect selection (X^2 = 50.33, p = -.00001, 6 df) and from the definition that was also written by the authors of the narrative selection (X^2 = 26.25, p = .001, 6 df).

Because the description selection was short and its tabulation seemed aberrant, I re-examined the only other selection labeled as descriptive. This is an even shorter pilot selection of thirteen sentences; it is Charles Dickens' literary description of Bradley Headstone in Our Mutual Friend. It also proves to be significantly different (X^2 = 14.06, p = .03, 6 df), as Bain's taxonomy predicts. This selection is not tabulated with other counts but is reported in "Table Four: Rhetorical Clues in 'Bradley Headstone.'

On the table of results ("Table Three: Rhetorical Clues in All Selections"), symbols have been added to highlight how labels and frequency coincide. An asterisk (*) marks the count for the mode as the editors labeled it; a crosshatch (#) marks the count for the mode that occurs most often in each selection; and a plus (+) marks the location of the highest number clues for each mode, to account for the variation of frequency of different types of clues. When all three symbols coincide, as they do for the narrative and classification selections, it is evident that the clues justify the label of the selection. The asterisk label (*) coincides with one of the other highs in results for the cause-effect and comparison-contrast selections, so further consideration of general frequencies is needed. Elsewhere the asterisk coincides with neither high.

The numbers in the results table, Table Three, are summarized as percentages in "Table Five: Percentages of Clues to Rhetorical Modes." The top part reports the number of clues for each mode as a percentage of all clues (excluding "Bradley Headstone"), with figures for the supplemental unlabeled part of the corpus separated from the basic, labeled selections. These percentages reflect the characteristic frequency for each type of clue in all kinds of compositions. The bottom part of the table singles out the clues that relate to the mode of the label of their selection, an average of 23%; this number contrasts with the 14% that would reflect a random occurrence of the clues in the selections. The lowest line is the ratio of the percent

Table Five: Percentages of Clues to Rhetorical Modes

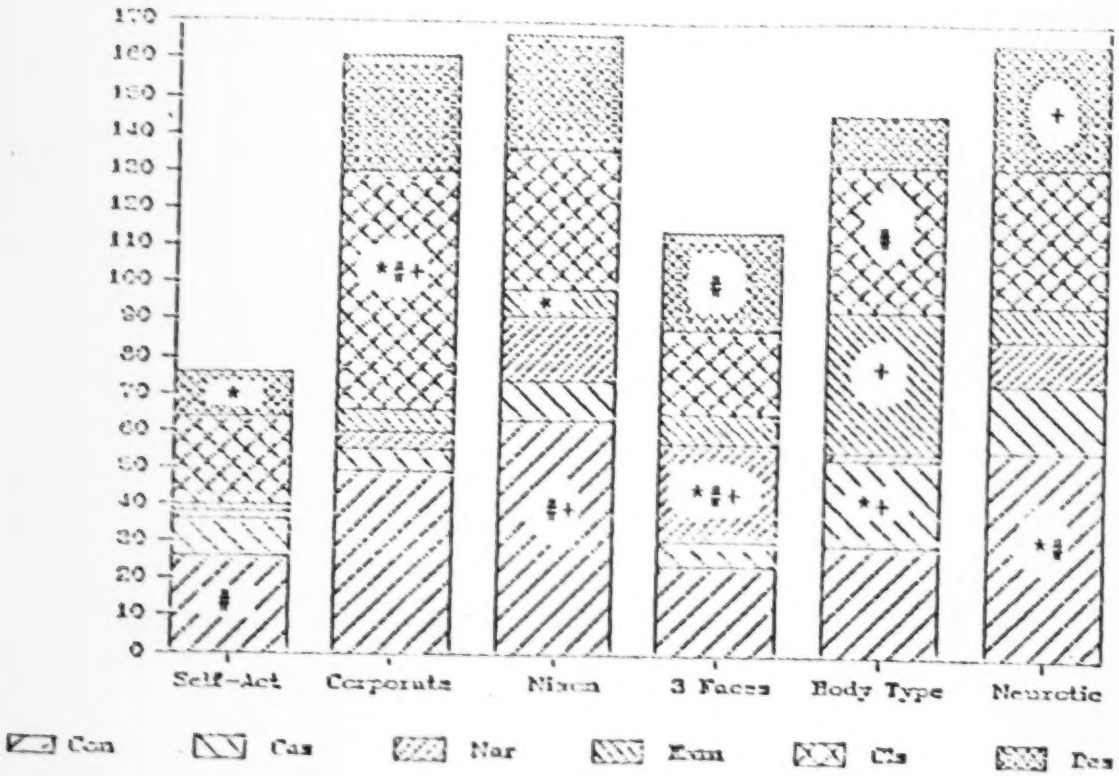
	Defin	Descr	Class	Examp	Narra	Cause	Contr	Total
% of 1069 Basic Clues	8	16	26	7	6	9	28	100
% of 161 Clues in Supplement	4	29	19	9	9	3	28	100
% of All 1230 Clues Reported	7	18	25	8	7	8	28	100
% of Clues of Type Matching the Label of the Selection	15	14	38	4	22	15	31	23
Ratio of % in Labeled Sel. to % in Total	2.1	.8	1.5	.5	3.1	1.9	1.1	

of these clues that match their labels (line 4) to the percent of clues of that specific type in the entire corpus (line 3). The higher the ratio, the more distinctive the selection appears. Narrative clues occur three times as often in the narrative model as in the mean; definition and causation clues occur twice as often in their models, but example clues occur only half as often as in the mean.

The overall proportions of the counts reported in Table Three are pictured in the stacked bar graph, "Figure One: Clues in Six Selections." It has vertical bars for each of six comparable labeled selections (omitting definition, which is presented in two separate short selections). This graph shows that most selections have several modes with a high frequency of clues and several modes with a low frequency, although clues for all modes are present in all selections; multiple high frequencies indicate that the modes are mixed. The graph illustrates also the basic characteristic pattern of heavy use of classification and comparison-contrast clues in selections in all modes. The existence of several high frequencies of clues complicates statistical analysis, because the counts appear random in statistics that focus on only a single high frequency.

As in Table Two, symbols have been added to the graph to highlight how labels coincide with frequency. (An asterisk [*] marks the count for the mode as the editors label it; a crosshatch [#] marks the count for the mode that occurs most often in each selection; and a plus [+] marks the location of the highest number clues for each mode, to account for the variation

Figure One: Clues in Six Selections



* The count for the mode as the editors labeled it.

The count for the mode that occurs most often in the selection.

\+ The highest number of clues for each mode.

of frequency of different types of clues.) Twice all three symbols coincide, illustrating how the clues justify the label of the selection. Twice the asterisk label [*] coincides with one of the other highs, showing a need for further considerations.

Several generalizations can be made about the rhetorical clues in the selections examined.

1. Clues for multiple modes of development are the rule.
2. Except in the extremely short selections (less than 15 sentences long), all types of clues occur in all of the selections.
3. Clues to mode of development may have either a local or a global application.
4. Selections in the same mode may have different proportions of clues.
5. Use of clues may reflect the proportional frequencies of a generalized style or a specialized style.
6. Individual writers use different clues for different modes.
7. Clues for different modes vary in their characteristic proportional frequency; specifically, classification and contrast clues abound, even in selections not labeled for them, while definition, narrative, and causation clues are rare except in the selections so labeled.
8. The hypothesized clues do not distinguish the basic selections that are labeled as description and example.
9. Clues for the two time-oriented modes, narration and cause-effect, appear statistically significantly different from the analytic modes.

Discussion

Changes in the definitions of clues could change the tabulations; however, several attempts at revision did not create significant differences. Combining clues for division with clues for classification did not enhance classification, and adding clues for syllogism to the clues for cause-effect did not enhance the latter. Also, no significant difference resulted from reinstating the negatives that were removed from the contrast category. The list of clues to description might be improved with the "has a" predicate, as in, "An elephant has a trunk." "Has a" is already used in some propositional programs, paralleling the "is a" of definition.

This study showed that clues are related to mode rather than to a writer's peculiarities, because one pair of authors wrote both a narrative and a definition selection, which were significantly different. Thus we can conclude that authors can vary their styles.

Of all the modes, the most distinct is narrative, as in the selection "The Three Faces of Eve". Its characteristics are apparent in the chi square statistics, in the ratio in Table Five, and in the graph in Figure One. Narrative clues were rarest overall, being concentrated in their own selection. Cause-effect clues also were statistically different from both narrative clues and from the mean. The uniqueness of narrative and cause-effect is predicted by D'Angelo's taxonomy of ten types. (Bain includes cause-effect analysis with exposition, and Longacre treats causation as a margin attached to other clauses.)

Cause-effect clues are relatively rare everywhere except in the selection labeled as exemplifying the cause and effect pattern, "Body Type and Personality." Cause-effect clues were indeed more numerous there than elsewhere. This selection's higher frequency of clues for classification, exemplification, and contrast reflects the fact that while it shows how body types cause different personality traits, it also contains many short examples of contrasts between the classifications of body types.

Contrast clues are the most common type overall (28%). If the odd example selection had not used so many contrasts, the three freqency symbols would have coincided for the comparison-contrast selection, "Neurotic, Normal, Psychotic," as well as for the narrative and the classification selection, "Corporate Personalities." Classification is the second most frequent type of clue in all the selections. It works with contrast in definition, which is relatively rare and may often be implicit. These mental processes work together very closely and seem more distinguishable on a sentence level than on a higher discourse level, where one may dominate (in sense if not in numbers) and influence how a selection will be interpreted by readers or labeled by editors.

There are significant differences in the two short definition models, although the very common classification clues are most numerous in both selections. The frequency of usually rare definition clues varies. "What Is Personality?" by C. H. Thigpen and H. Cleckley has proportionately many more definition clues than appear in the other definition selection ("What Is Type A

Behaviour?") or in the narrrative selection by the same two authors ("The Three Faces of Eve"). These authors use clues in a way that distinguishes their narrative from their definition article and from the other short definition selection. Apparently great variety can occur within a single mode and within authors' styles.

For two selections, the tabulations do not correlate with the mode labels. The selection that is labeled descriptive ("Self-Actualizing People") in fact has fewer clues for description than for contrast or classification; it seems to be distinguishing a class, not describing a single individual. The ideal descriptive tabulations developed from an alternative 13-sentence literary description of Bradley Headstone by Dickens. These results identify it distinctively as description. (See "Table Four: Rhetorical Clues in 'Bradley Headstone.'") Thirty-eight percent of all clues in this selection are descriptive, while in the total corpus only 18% of the clues indicate this mode, a respectable ratio of 2.1.

If this alternative finding holds, it supports Bain's separation of descripton as a distinctive mode. There may be some difference between literary and non-literary styles of description. It may be that specific academic fields have their own distinctive descriptive styles that differ from the descriptive style of literary writing. Descriptive chemistry, for example, may have its own way of reporting changes that occur during reactions. When Kent did a tagmemic analysis of freshman writing, she found that descriptions of "leaves" differed

significantly from descriptions of "fall" in that the latter established a geographical context. These variations and cultural variations need further exploration.

This study of linguistic clues did not consider how information is framed in topic and comment, as analyzed by functional sentence perspective, although that approach could be very useful. Another possibility is that the relative brevity of the descriptive selections might have affected the analysis of their clues.

Example clues also had aberrant statistics. Example clues appear twice as often in the total corpus as in the selection presented as a model of exemplification. In that selection as well as in the overall total, comparison-contrast clues are the most frequent type; in fact, they are even more frequent in the peculiar example selection. That excerpt, "Nixon as Active-Negative," has the most contrast clues, but it has fewer example clues than all but two of the other selections, and it has in itself fewer example clues than any other kind of clues. Its most frequent clues indicate comparison-contrast because the selection compared Richard Nixon's actions with what he might have done.

The title of the example selection is the only specification of the author's purpose, to present Nixon as an example of the active-negative type of presidential character. If titles had been tabulated, this single mention that applies to the entire selection would not change the tabulations much. The global application here would maintain a low frequency, while elsewhere

each one-word example might use a separate local clue to establish a much higher frequency. Perhaps global exemplification clues are too rare for valid statistical analysis of this type, just as contrast clues are so abundant everywhere that it is hard for selections labeled for them to appear distinct.

Although mixtures of mode confound statistics, the editors accept mixtures without analyzing how embeddings occur or how modes combine to work together. They comment at the end of the Nixon selection:

> An important point to keep in mind is that when we speak of "classification" and "example," we are not speaking of hard and fixed categories. Seldom will you come across a passage of writing that is purely classification or purely example. Rather, most writing represents a mixture of approaches. ... So when we use a particular piece of writing as an example of some particular approach, such as classification, we are doing so only because this is a convenient way of isolating [sic] and focusing upon a particular mode of expression or organization. By focusing upon this mode, you will learn to recognize it in the writing of others and to use it purposefully in your own writing. (539-540.)

The frequency of mixtures of approaches suggests that the mental processes can be considered as sentence-level heuristics as well as patterns for organizing the much longer discourses that are presented as models. Since the analytic processes of definition, classification, exemplification, and comparison work together in theory and in the fact of the reported tabulations, they are properly associated in the taxonomies that distinguish them from narration. Although human writers combine these

processes, artificial intelligence needs objective linguistic distinctions as rules for translating natural language into propositions in a form that it can interpret.

This study was limited to explicit linguistic expressions in the surface structure. It did not distinguish clues with global application from clues for local embedded development, nor did it consider functional sentence perspective. Nevertheless, of the seven rhetorical modes examined, linguistic clues justify the labels of five types of selections, besides an alternate. Some statistically significant distinctions correspond with taxonomies and with insights from cognitive psychology. These results demonstrate the mixtures of modes and perhaps raise questions about the efficacy of presenting models of modes to students. These results need to be sustained with a larger sample in a study that takes the limitations into account, in order to apply them to education or to computation.

Note

Research evidence going back sixty years indicates syntactic differences in writing on different topics and in different modes, although those differences are not the ones commonly taught as distinguishing mode. In 1927, for example, Boder found that the number of adjectives per hundred verbs ranged from 11.2 in plays, to 20.0 in laws, 35.2 in fiction, and 75.4 in science. In 1933 Frogner found dependent clauses in 41.6% of the sentences in student' social letters, in 44.5% of their narrative sentences, and in 52% of their expository sentences. For Seegers, also in 1933, dependent clauses appeared least often in narration and description by elementary children, more in exposition, and most in their argumentation. In 1953, however, Kincaid found that mode affected the quality of writing done by weaker college freshman writers only. In 1967, Johnson reported that in writing by third-grade children, description had the shortest sentences and the greatest percent of simple sentences, while exposition had the longest sentences and the lowest percent of simple sentences, and narration was between on both counts. The average number of sentence types was 2.1 for description, 2.4 for exposition, and 3.1 in narration. In 1967, Bortz found that intermediate children wrote their longest T-units with the most complexity in expository compositions; they wrote with least complexity in narration, yet their description had shortest T-units but the most subordinate

adjective clauses. In 1971, Veal and Tiller also found differences related to modes in the writing done in second, fourth, and sixth grades. In 1972, Nietzke found higher T-unit means in critical themes than in themes about personal experience. In speech, in 1974, Pope found that T-units were longer in explanations than in narratives. These incidental artifacts reveal consistant differences, although the features are not usually taught as means to distinguish mode.

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